

Galileo

*The European Programme for
Global Navigation Services*

Civil Engineering



Accuracy and reliability are well-known requirements in civil engineering. Decreasing cost and increasing efficiency are, today, part of the game. Combined with digital mapping, Galileo offers a powerful tool for improving productivity while preserving standards in all areas – starting from the planning of structures, to the maintenance and surveillance of existing constructions.

Some examples of practical uses of Galileo

*** Structure monitoring**

Galileo receivers on and around bridges, barrages, dams, skyscrapers and historical monuments, for example, can provide important structural monitoring. Satellite techniques can also be used in predicting natural events such as landslips, land settling/rising and rock-falls, and measuring the levels of rivers and lakes. A transmission link ensures the data reach a processing and monitoring centre for realtime detection of any movement.

Many bridges are carrying greater average loads than predicted during their design, so there has been a significant increase in the need over the past few years to monitor bridge performance. Some bridges are undergoing major repairs and retrofitting to fix critical deficiencies. Satellite receiver technology and data-processing software are now cost-effective tools, which can be integrated into an automated continuously operating system.

*** Machinery guidance**

Civil engineers use heavy machinery in many types of construction. Galileo receivers and real-time kinematic techniques can guide these machines precisely to perform their work. The same technique can be used for automated guidance of machines working in dangerous

areas or simply to save manpower in repetitive work (navvying, flattening, levelling, compressing). The computer compares the actual Galileo-derived position with the desired finished terrain, using grid files created from topographic maps. A large, bright display provides visual guidance to the operator for manoeuvring the vehicle and positioning the blade to achieve the cut-and-fill values needed to match the computer model. A number of surface mines have recently installed satellite-based machine guidance systems with very positive results in productivity and costs.

*** Construction site management and logistics**

During the long construction of large structures, it is important to have efficient logistics as well as a coherent and common localisation tool. The way to access the work area often changes as construction advances, and many vehicles are on the move at the same time. All these activities need



efficient management to avoid confusion and wasted time. Galileo will provide continuous and highly accurate positional information for the entire construction site. The Øresund bridge between Sweden and Denmark, and the huge sites in the centre of Berlin are good examples. For such undertakings, Galileo will continuously provide highly accurate position for the entire construction site.



Galileo



* Road/rail infrastructure maintenance

Europe's large road and rail networks mean that civil engineers must now focus on their maintenance. Roads and rail tracks must be surveyed periodically to look for changes in shape and loads. Often, this disrupts traffic as the maintenance vehicles go about their work. Galileo will speed up the work by stamping each measurement (incline, alignment, image) with a date and position. Then, processing and data analysis can be made off-line.

Fleet management systems based on Galileo can monitor the location and activities of maintenance vehicles. The faster and more efficient operations will also help to reduce traffic congestion.

Galileo Benefits

Integrating Galileo with other technologies will:

- help to improve logistics
- help to optimise human resources
- lead to increased efficiency with no loss in quality
- lead to increased safety on the construction site

How is Galileo different from other systems?

- ✓ increased accuracy, service guarantees, certification and liability of the service operator
- ✓ traceability of past performance and operation transparency
- ✓ increased availability of signals in demanding environments

Galileo: The European Satellite Navigation Programme is a joint initiative of the European Commission and the European Space Agency. Galileo will offer positioning and timing services worldwide.

For additional information, please contact the Galileo Joint Undertaking: JU@galileo-pgm.org